REMARKS

Claims 1-11 are pending in the pending application.

Claims 3-4, 8 and 11 are found to contain allowable subject matter.

Claims 1-2, 5-7 and 10 are rejected as anticipated by Chow et al. and claim 9 is unpatentable over Chow et al. in view of Suzuki et al.

Claim Amendments

Claims 1 and 2 are cancelled herein without prejudice.

Claims 3, 4 and 8 are amended to independent form. Accordingly, claims 3, 4, 8 and 11 should be allowed as indicated by the Examiner.

Claim 12 is newly added to substitute for the claim 1 and claims 5-7 are amended so as to depend on the newly added claim 12. Applicant's claim 12 is supported by at least page 15, line 4 though page 20, line 26 as well as Figs. 7 and 8 of the present application. Further, Fig. 4 indicates the presetting of the designated protection route in each node.

No new matter is entered.

Applicant's claim 12 relates to a method of designing protection route information in advance, which is to be preset in a plurality of nodes forming a communication network, by a system such as a network management system, which is provided separately from the plurality of nodes.

Applicant's claim 12 includes the distinguishing features of designing protecting route information on a protecting route, and presetting the designed protecting route information in a plurality of nodes provided in a communication network and includes the step of: "presetting the protecting route information on the updated protecting route in the plurality of nodes."

Therefore according to the claimed presetting the protection route information designed is preset in each of the plurality of nodes forming the communication network, before the communication network is employed and prior to a failure in which switchover from the working route occurs.

Claim Rejections

Chow et al. (hereinafter Chow) teaches that the protection route searching and selection is performed dynamically during the operation of the network and <u>when a failure is detected</u>. Chow discloses that two nodes detecting a failure during operation of a network broadcast restoration request messages, a "Black message" and a "Gray message," respectively, and once a node receives both the "Black message" and "Gray message", the node transfers the "Black message" and "Gray message" via the known routes, on which the "Black message" and "Gray message" have been transmitted, respectively so that a protection route is searched and selected.

In contrast applicant's claimed invention recites presetting the protecting route information on the updated protecting route in the plurality of nodes. Therefore when a failure occurs in the communication network during an operation phase, a node detecting the failure transmits a failure notice message including failure location information to each node, and nodes receiving the failure notice message can switch to a protection route, <u>based on the preset protection route information</u>.

Chow is different because, as mention above, Chow's "Black message" and "Gray message" teaches, the protection route searching and selection is performed dynamically during the operation of the network <u>"upon detection of a cut link"</u> (Abstract).

Applicant's claimed invention includes the advantages having the protection route information designed in advance by the management system provided independently from and

preset in the plurality of nodes, the protection route information is obtained to meet such a requirement that a protecting route can minimize a transfer time of the failure notification message from the failure detection node, and that the protecting route has a spare communication capacity sharable for a different failure and has a route switchover time to be completed within a given time limit.

Accordingly, the protection route information set in each of the plurality of nodes is preset before the operation phase, and thus, each node need not search or select any protection route when a failure is detected in Chow. Therefore faster switching to the protection route can be exercised. As pointed out above this is explained in detail on page 15: 4 though page 20: 26 as well as Figs. 4, 7 and 8.

Additionally it is respectfully submitted that Chow's method of obtaining a protection route by "the short path heuristic" is different from the method of obtaining a protection route having "a spare communication capacity sharable for a different failure" according to the present claimed invention.

Applicant's claimed invention provides for, when searching and obtaining a protection route, the protection route is formed with a link capable of sharing a spare communication capacity even when a failure occurs at the same time as a different failure occurs.

This is possible because the information is preset.

For example, as indicated in Fig. 12 of the present application, when a protection route is designed for failure 81, a spare communication capacity of links N5-N8 in the protection route 85 for the failure 84 and a spare communication capacity of links N5-N8 and N8-N9 in the protection route 87 for the failure 86 are assigned for failure 81 so that the spare communication capacity can be shared. By this, a part of the spare communication capacity of links N5-N8, N6-

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N9 and N8-N9 is shared, and the protection route 88 is set for failure 81. Accordingly, a spare communication capacity of link N5-N6, which is consumed only for failure 81 becomes unnecessary in the case the protection route 83 is employed.

In this manner, spare communication capacity of each link in a protection route for failure is fixedly assigned so as to share the spare communication capacity among protection routes as much as possible, and thus, a total of spare communication capacity required for entirety of a communication network can be reduced.

Chow fail to disclose such a method of presetting a protection route before operation of the communication network so as to share a spare communication capacity even in the case that different failures occur at the same time.

Generally and as disclosed in Chow, a usable spare band (spare communication capacity) is not assigned to protection routes for each failure in advance, and a spare band is not prepared for any specific failure, but is shared for every failure in such methods of managing spare band obtained during operation of a network.

In the prior art if there is a considerable time difference between failures, or a present failure and different future failure, it will be possible that a spare band can be shared. But, if the failures occur at the same time, it is natural to consider a spare communication capacity can not be shared. This is because a spare band is dynamically searched and selected whenever a failure occurs, by the above explained method, and there is no guarantee to share the spare band for failures occurring at the same time. Further, it takes considerable process time, for example several hundred milli-seconds required for dynamically searching and assigning a protection route.

Contrarily, in the present claimed invention, a spare band for each failure is fixedly assigned in advance so that the spare band can be shared between different failures, and thus, it is possible to assign the spare band between current different failures.

Further, after a route is switched to a protection route due to a certain failure, a network status or condition is changed unless the protection route is switched back to the original route. To cope with different future failures effectively, that is, to minimize a spare band, network information is collected to redesign an appropriate protection route, and the redesigned result is set in each node.

SUMMARY

As explained above, in an exemplary embodiment, the network management system NMS designs in advance a protection route for each failure so that a spare communication capacity or spare band can be minimized and switching over to the protection route is performed within a limited time, and the designed protection route is preset as protection route information in each node before the operation of the communication network. During the operation of the communication network, when a failure occurs, each node switches a route to a protection route based on the protection route information preset therein.

In contrast Chow teaches a system where a protection route is dynamically searched first at the time of a detected failure, and selected to be switched over thereto, by broadcasting "Black message" and "Gray message" simultaneously.

The system disclosed by Chow is very different from that of the claimed invention, and Chow fails to indicate that a spare communication capacity can be shared between different failures and that the protecting route information on the updated protecting route is preset in the plurality of nodes.

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Accordingly, Claim 12 and its associated dependent claims should not be anticipated by Chow.

Please charge the amount of $200.00 for one extra independent claim to Deposit Account 50-1290.

In view of the remarks set forth above, this application is in condition for allowance which action is respectfully requested. However, if for any reason the Examiner should consider this application not to be in condition for allowance, the Examiner is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged to Deposit Account No. 50-1290.

Respectfully submitted,

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PAGE 17/17 * RCVD AT 12/1/2005 2:17:55 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/36 * DNIS:2738300 * CSID:2129407049 * DURATION (mm-ss):07-50